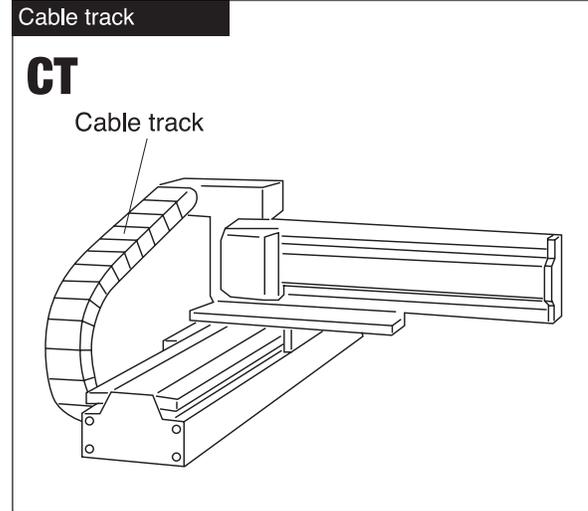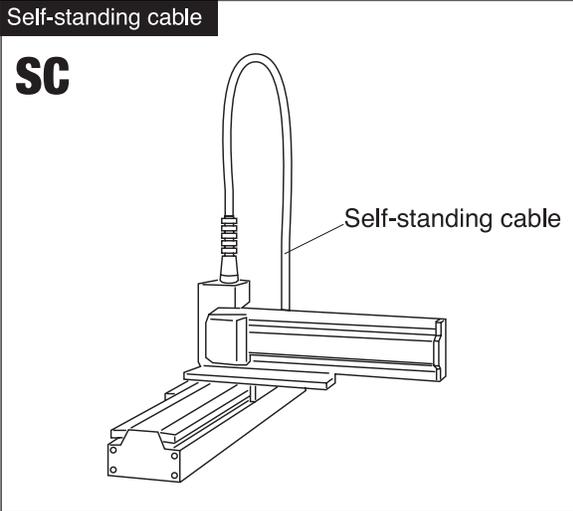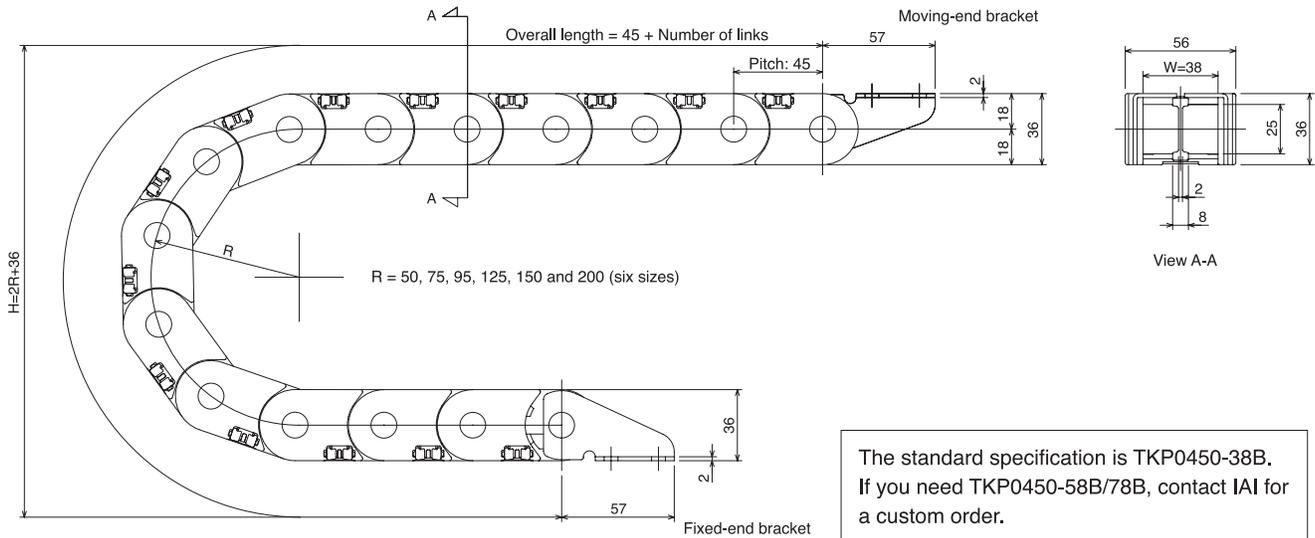## ■ Cable Variations

The XYB type lets you select the self-standing cable (code: SC) or cable track (code: CT) variation.
Select an appropriate option depending on your specific need.

Self-standing cable	Cable track
SC	**CT**

Self-standing cable

Cable track

● Detail Drawing of Cable Track

Standard   TKP0450-38B (Manufacturer: Tsubakimoto Chain)

Overall length = 45 + Number of links

Moving-end bracket

Pitch: 45

57

2

18

18

36

H=2R+36

R

R = 50, 75, 95, 125, 150 and 200 (six sizes)

56

W=38

25

36

2

8

View A-A
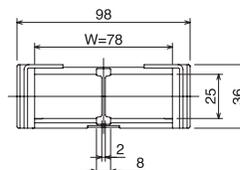
36

2

57

Fixed-end bracket

> The standard specification is TKP0450-38B.
> If you need TKP0450-58B/78B, contact IAI for a custom order.

Specified Product   TKP0450-58B/TKP0450-78B
(Manufacturer: Tsubakimoto Chain)

TKP0450 – 58B

78
W=58
25
36
2
8

TKP0450 – 78B

98
W=78
25
36
2
8
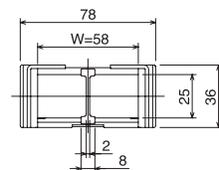
View A-A

Allowable Dynamic Moment and Allowable Static Moment

There are two types of moment that can be applied to the the guide: the allowable dynamic moment and the allowable static moment.
The allowable dynamic moment is calculated from the travel life (when flaking occurs) when moved with the moment load applied.
In contrast, the static moment is calculated from the load that causes permanent deformation to the steel ball or its rolling surface (i.e. rated static moment), taking into account the rigidity and deformity of the base.

[Allowable Dynamic Moment]

IAI's catalog contains the allowable dynamic moments based on a load coefficient of 1.2 and 10,000km or 5,000km.
This value is different from the so-called basic rated dynamic moment, which is based on a 50km travel life.
To calculate the basic rated dynamic moment for a 50km travel life, use the following equation.

$$M_{50} = f_w \times M_S \div \left(\frac{50}{S} \right)^{\frac{1}{3}}$$ ···· Equation 1

M_S : Allowable dynamic moment at an assumed travel distance (catalog value)
S : IAI catalog assumed travel life (5,000km or 10,000km)
f_w : Load coefficient (=1.2)
M_{50} : Basic rated dynamic moment (50km travel life)

The allowable dynamic moments mentioned in the catalog (10,000km or 5,000km life) are based on a load coefficient f_w=1.2. To calculate the service life of a guide with a different load coefficient, use Table 1 below to determine the load coefficient that matches your requirements.

Table 1: Load Coefficients

Operation and Load Requirements	Load Coefficient f_w
Slow operation with light vibration/shock (1500mm/s or less, 0.3G or less)	1.0～1.5
Moderate vibration/shock, abrupt braking and accelerating (2500mm/s or less, 1.0G or less)	1.5～2.0
Operation with abrupt acceleration/deceleration with heavy vibration/shock (2500mm/s or faster, 1.0G or faster)	2.0～3.5

$$L_{10} = \left(\frac{C_{IA}}{P} \cdot \frac{1.2}{f_w} \right)^3 \times S$$ ···· Equation (2)

L_{10} : Service life (90% Survival Probability)
C_{IA} : Allowable dynamic moment in IAI Catalog (5,000km or 10,000km)
P : Moment used ($\leq C_{IA}$)
S : IAI catalog assumed travel life (5,000km or 10,000km)
f_w : Load coefficient (from Table 1)

[Allowable Static Moment]

The maximum moment that can be applied to a slider at rest.
These values are calculated by taking the basic rated static moment of the slider and multiplying with the safety rate that takes into consideration any effects from the rigidity and deformity of the base.
Therefore, if a moment load is applied to the slider at rest, keep the moment within this allowable static moment. However, use caution to avoid adding any unexpected shock load from any inertia that reacts on the load.

[Basic Rated Static Moment]

The basic rated static moment is the moment value at which the sum of the permanent deformation at the center of contact between the rolling body (steel ball) and the rolling surface (rail) is 0.0001 times the diameter of the rolling body.
These values are simply calculated strictly from the permanent deformation done to the steel ball and its rolling surface. However, the actual moment value is restricted by the rigidity and deformation of the base. Hence, the allowable static moment the actual moment that can be applied statically, taking into account those factors.

Motor Cable / Encoder Cable

These are joint cables to connect the actuator cable joint connector and the controller.

There are two kinds of cables; a motor cable for the motor power, and an encoder cable for the encoder signals.
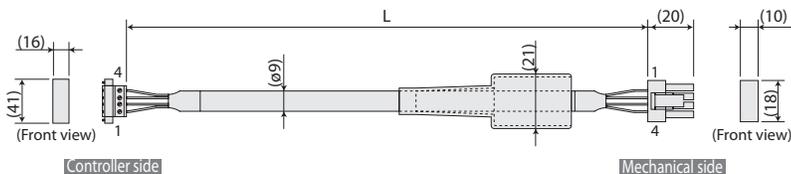
Also, when you use the cable with a cable track, please use the robot cable which is heavy-duty and has excellent bending resistance. (*)

(*) For motor/encoder cables for single-axis robots, all the standard cables are robot cables.

Motor cable (for XSEL-J/K/P/Q, SSEL, SCON)

Model: **CB-X-MA□□□**

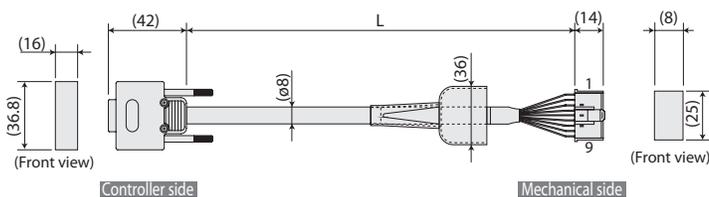* □□□ is the cable length (L); supports up to 30m.
Example: 080 = 8m

Minimum bend radius R: r = 51mm or larger (for movable use)

Wire	Color	Signal	No.		No.	Signal	Color	Wire
0.75sq	Green	PE	1		1	U	Red	
	Red	U	2		2	V	White	0.75sq
	White	V	3		3	W	Black	(crimped)
	Black	W	4		4	PE	Green	

Encoder cable (for XSEL-J/K)

Model: **CB-X-PA□□□**

* □□□ is the cable length (L); supports up to 30m.
Example: 080 = 8m

Minimum bend radius R: r = 44mm or larger (for movable use)

Wire	Color	Signal	No.		No.	Signal	Color	Wire
0.15sq (crimped)	—	—	1		1	BAT+	Black	
	—	—	2		2	BAT-	Yellow	
	—	—	3		3	SD	Blue	
	—	—	4		4	$\overline{SD}$	Orange	
	—	—	5		5	VCC	Green	0.15sq (crimped)
	—	—	6		6	GND	Brown	
	Blue	SD	7		7	FG	Ground	
	Orange	$\overline{SD}$	8		8	BK-	Gray	
	Black	BAT+	9		9	BK+	Red	
	Yellow	BAT-	10					
	Green	VCC	11					
	Brown	GND	12					
	Gray	BK-	13					
	Red	BK+	14					
	—	—	15					

The shield is clamped to the hood.   Braided ground & shield wire

Limit switch cable (for XSEL-J/K)

Model: **CB-X-LC□□□**

* □□□ is the cable length (L); supports up to 30m.
Example: 080 = 8m

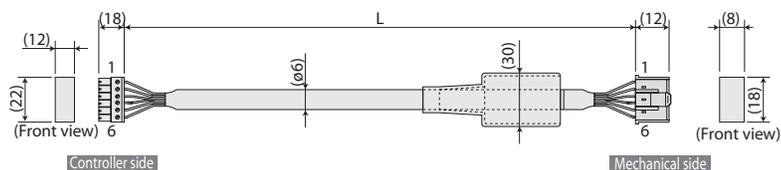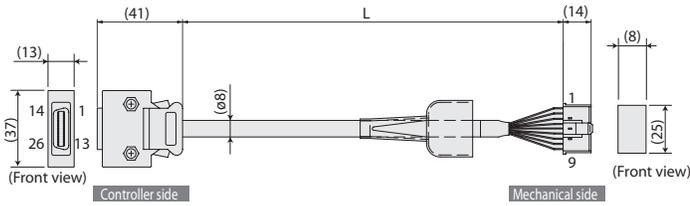Minimum bend radius R: r = 33mm or larger (for movable use)

Wire	Color	Signal	No.		No.	Signal	Color	Wire
AWG24	Light Blue	24VOUT	6		1	24VOUT	Light Blue	
	Pink	N	5		2	N	Pink	
	Light Green	LS	4		3	LS	Light Green	AWG24 (crimped)
	Orange	CREEP	3		4	CREEP	Orange	
	Gray	OT	2		5	OT	Gray	
	1B/Light Blue	RSV	1		6	RSV	1B/Light Blue	

Note) 1B indicates one black dot mark.

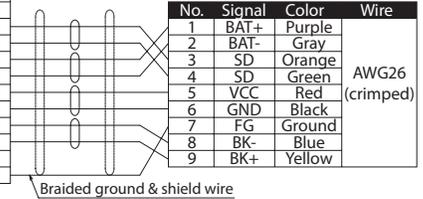## Encoder cable (for XSEL-P/Q, SSEL, SCON)

Model: **CB-X1-PA□□□**

* □□□ is the cable length (L); supports up to 30m.
Example: 080 = 8m

Plug housing: XMP-09V (Nichiatsu)
Socket contact: BXA-001T-P0.6 (Nichiatsu) x 9
Retainer: XMS-09V (Nichiatsu)

Minimum bend radius R: r = 44mm or larger (for movable use)

Wire	Color	Signal	No.
	—	—	10
	—	—	11
	—	E24V	12
	—	OV	13
	—	LS	26
	—	CREEP	25
	—	OT	24
	—	RSV	23
	—	—	9
	—	—	18
	—	—	19
AWG26 (soldered)	—	A+	1
	—	A-	2
	—	B+	3
	—	B-	4
	—	Z+	5
	—	Z-	6
	Orange	SRD+	7
	Green	SRD-	8
	Purple	BAT+	14
	Gray	BAT-	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR-	20
	Yellow	BKR+	21
	—	—	22

The shield is clamped to the hood

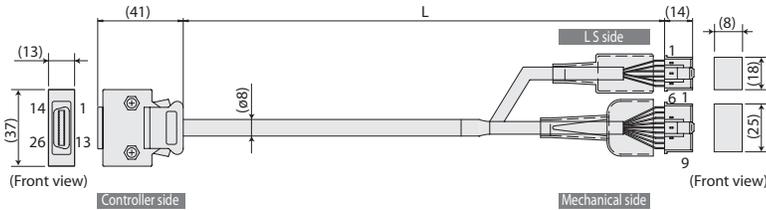| No.	Signal	Color	Wire
1	BAT+	Purple	
2	BAT-	Gray	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	AWG26 (crimped)
6	GND	Black	
7	FG	Ground	
8	BK-	Blue	
9	BK+	Yellow	

Braided ground & shield wire

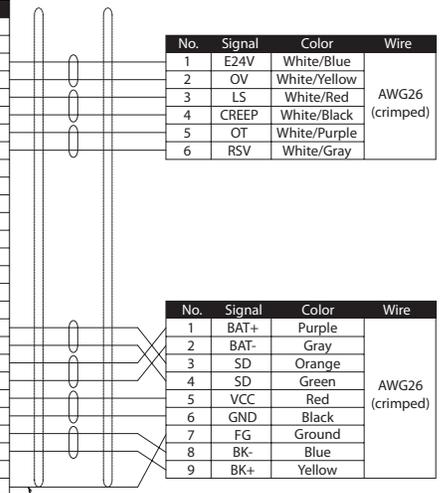## Encoder Cable (for XSEL-P/Q, SSEL, SCON, and LS equipped connection)

Model: **CB-X1-PLA□□□**

* □□□ is the cable length (L); supports up to 30m.
Example: 080 = 8m

Minimum bend radius R: r = 54mm or larger (for movable use)

Wire	Color	Signal	No.
	—	—	10
	—	—	11
	White/Blue	E24V	12
	White/Yellow	OV	13
	White/Red	LS	26
	White/Black	CREEP	25
	White/Purple	OT	24
	White/Gray	RSV	23
	—	—	9
	—	—	18
	—	—	19
AWG26 (soldered)	—	A+	1
	—	A-	2
	—	B+	3
	—	B-	4
	—	Z+	5
	—	Z-	6
	Orange	SRD+	7
	Green	SRD-	8
	Purple	BAT+	14
	Gray	BAT-	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR-	20
	Yellow	BKR+	21
	—	—	22

The shield is clamped to the hood

No.	Signal	Color	Wire
1	E24V	White/Blue	
2	OV	White/Yellow	
3	LS	White/Red	AWG26 (crimped)
4	CREEP	White/Black	
5	OT	White/Purple	
6	RSV	White/Gray	

No.	Signal	Color	Wire
1	BAT+	Purple	
2	BAT-	Gray	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	AWG26 (crimped)
6	GND	Black	
7	FG	Ground	
8	BK-	Blue	
9	BK+	Yellow	

Braided ground & shield wire

(White/Blue in cable color indicates the colors of line/insulator.)

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